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OUTLOOK FOR MEETING FUTURE TIMBER DEMANDS



Based on Highlights
of Latest National
Timber Review

ROCKY MOUNTAIN STATION

FEB 26 1974

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TIMBER SUPPLY AND DEMAND TRENDS STUDY

Approximately every decade, the Forest Service in the U. S. Department of Agriculture appraises the extent and condition of timber resources in the United States as a means of determining present and potential supplies of wood. This information is matched with an evaluation of prospective future demands of the American people. Such a study of timber supply and demand, as of 1970, has just been completed and a preliminary draft of the study report has been prepared for review.

This new study is the third of a series of recent comprehensive timber appraisals authorized by the McSweeney-McNary Forest Research Act of 1928. This directs the Secretary of Agriculture to cooperate with the States and other agencies in "making and keeping current a comprehensive survey of the present and prospective requirements for timber and other forest products in the United States, and of timber supplies...as a means to balance the timber budget of the United States." A "Timber Trends Study," based on 1962 data, was published in 1965 and a "Timber Resources Review," based on 1952 data, was published in 1958. A final report on the present study will be published within the coming year.

INTRODUCTION

TIMBER SUPPLY-DEMAND-PRICES OF HIGH CURRENT INTEREST

Present concern and debate over timber supplies, timber demands, and timber prices make a number of the preliminary findings of the timber supply-demand study especially timely.

As a result of rising lumber and plywood prices during 1968 and 1969, a Presidential Task Force on Softwood Lumber and Plywood was created in 1969 to look into lumber prices, supply, and demand. A number of recommendations were made by this task force, including the establishment of an advisory panel to look into overall timber supply and related environmental problems. This panel, created in late 1971, is presently working on its report.

The rising lumber and plywood prices of 1971-72 have again caused concern about the Nation's ability to meet future demands for wood products.

The present study relates primarily to the long term outlook for timber supplies and demands in a changing environmental context. Preliminary findings indicate that under present levels of forest management the Nation will increasingly face higher prices for timber products and increasing difficulty in meeting future demands for lumber, plywood, paper, and other wood products in the future. However, since the growth of a forest is an activity that requires decades, it is imperative that the long term outlook be fully considered in current deliberations on the role of forests in American society.

Supplies and prices of wood products, such as lumber and plywood, have a direct bearing on costs of housing and other primary social needs. The availability of timber resources, and the direction and intensity of future forest management activities, also have a bearing on the full spectrum of non-timber forest uses and related economic, social, and environmental concerns.

The preliminary findings of the present study will be of considerable importance in current discussions of our ability to meet future needs of the American people for timber products within a quality environment. The study provides basic timber resource statistics as of 1970, project timber supplies to the year 2020, and potential demands for timber under alternative price conditions. The highlights here presented, as well as considerable additional information, are covered in much greater detail in the full study report.

MAJOR TIMBER SUPPLY-DEMAND FINDINGS *

1. DEMANDS FOR WOOD PRODUCTS HAVE INCREASED 70 PERCENT IN THE LAST THREE DECADES AND SIMILAR SUBSTANTIAL INCREASES ARE EXPECTED THROUGH THE END OF THIS CENTURY.

2. DURING THE PAST THREE DECADES, LUMBER CONSUMPTION ROSE 49 PERCENT. USE OF PULP PRODUCTS CLIMBED 235 PERCENT. CONSUMPTION OF VENEER AND PLYWOOD INCREASED 475 PERCENT.

3. NET GROWTH OF SOFTWOOD INCREASED ABOUT ONE-THIRD BETWEEN 1950 AND 1970. THIS INCLUDED ABOUT 40 BILLION BOARD FEET OF SOFTWOOD SAWTIMBER SUITABLE FOR LUMBER AND PULPWOOD. NET GROWTH OF HARDWOODS INCREASED NEARLY AS MUCH, WITH GROWTH OF THE HARDWOOD SAWTIMBER PORTION OF THE TOTAL AMOUNTING TO 20 BILLION BOARD FEET.

4. WITH CURRENT LEVELS OF FOREST MANAGEMENT FOR TIMBER PRODUCTION, ONLY MODEST INCREASES IN TIMBER HARVESTS WILL BE AVAILABLE IN THE NEXT FEW DECADES. INADEQUATE SUPPLIES OF TIMBER TO MEET RISING DEMANDS WILL LEAD TO CONSEQUENT INCREASES IN PRICES OF TIMBER AND TIMBER PRODUCTS.

5. INCREASING PRESSURES FOR TRANSFERRING LAND FROM COMMERCIAL FORESTS TO RECREATION AND OTHER NON-TIMBER USES, AS WELL AS INCREASED ENVIRONMENTAL CONSIDERATIONS, HAVE A DIRECT EFFECT ON TIMBER SUPPLIES.

6. RISING IMPORTS OF WOOD PRODUCTS WILL PROVIDE SOME INCREASES IN SUPPLY BUT MAY BE LARGELY OFFSET BY INCREASES IN EXPORTS.

7. GREATER USE ON NON-WOOD MATERIALS AS SUBSTITUTES CAN BE A PARTIAL SOLUTION TO FUTURE WOOD SUPPLY PROBLEMS, BUT COULD HAVE UNDESIRABLE ENVIRONMENTAL AND ECONOMIC EFFECTS.

8. THE TWO MOST PROMISING METHODS FOR INCREASING SUPPLIES AND HOLDING DOWN PRICES ARE (1) INTENSIFYING GROWTH RATES OF TIMBER IN DOMESTIC FORESTS, ESPECIALLY ON THE 296 MILLION ACRES OF NON-INDUSTRIAL PRIVATE LANDS WHICH MAKE UP THREE-FIFTHS OF THE COMMERCIAL FOREST LAND BASE, AND (2) IMPROVING PRODUCT YIELDS FROM AVAILABLE RAW MATERIALS.

9. INCREASED RESEARCH AND APPLICATION EFFORTS COULD INCREASE SUPPLIES OF TIMBER AND WOOD PRODUCTS SUBSTANTIALLY THROUGH SOLUTION OF PROTECTION, HARVESTING, PROCESSING, AND UTILIZATION PROBLEMS.

10. DUE TO THE LONG TERM NATURE OF FORESTRY, DECISIONS MUST BE CONSIDERED PROMPTLY AS TO HOW WE ARE TO MEET FUTURE DEMANDS FOR TIMBER PRODUCTS WHILE SIMULTANEOUSLY PROVIDING FOR NON-TIMBER USES OF FORESTS AND ENVIRONMENTAL PROTECTION.

*This study reflects the supply-demand situation for timber as of 1970, and the projected supply-demand situation through 2000 based on current levels of forest management throughout the Nation. It does not attempt to project increased demands that may be made for other forest outputs than timber, except in terms of estimated reductions in available commercial forest acreage.

AVAILABLE SOURCES OF TIMBER SUPPLIES

A third of the land surface of the United States is covered by forests--753 1/2 million acres. This study, however, focuses on the approximately 500 million acres classed as commercial forest land which is considered suitable and available for continually growing crops of timber for harvest in the foreseeable future. This is called commercial forest land.

Not included in this commercial forest acreage is that public land which has the site potential to produce commercial timber but which has been excluded from timber harvesting. This includes some 17.2 million acres set aside in parks, wilderness or other specific uses and 2.7 million acres of National Forest land deferred from any Timber Management activities while under study for possible wilderness classification.

Who Owns Commercial Forest Lands?

Nationwide, 18 percent of the commercial forest land is within National Forests, 9 percent in other Federal, State, and county holdings, 14 percent operated by industrial forest companies and 59 percent in farm and miscellaneous holdings. Most of this commercial forest land is located in the East, primarily in small private farm and miscellaneous ownerships.

Commercial Forest Land Ownership		
	Percent	Acres
National Forests	18	92 million
Other Federal, State, and County	9	44 "
Forest Industry	14	67 "
Farm and Miscellaneous	59	296 "

Commercial Forest Lands Declining.

Significant to future timber growing prospects is the fact that in the last few years, the commercial forest timber growing base has started to dwindle. Pressures have grown to use more forest lands for recreation and other non-timber purposes, such as urban development, airports and reservoirs. This has led to the reversal of the trend of the previous few decades in which commercial forest area had grown steadily. The 1970 total of 500 million acres of commercial forest is 8.4 million acres less than in 1962. This trend of decline is assumed to continue at the

rate of five million acres each decade for the next 50 years, a total area greater than the State of Nebraska. This means that considerably fewer acres will be available for timber growing in the future.

Harvests on Private Farm and Miscellaneous Commercial Forest Lands Are Low in Proportion to Acreage Held.

Of the 12.2 billion cubic feet of roundwood (all wood used for products) harvested from U.S. forests in 1970, 48 percent came from the nonindustrial private lands, 28 percent from forest industry lands, and 24 percent from public lands. At present levels of management, the percentages by 2000 are expected to be 56 percent for nonindustrial private lands, 20 percent for industry land, and 24 percent for public land.

Percentage of Harvest by Ownership (1970)

	<u>Percent of Harvest</u>	<u>Percent of Acreage</u>
All Public Lands	24	27
Forest Industry	28	14
Farm and Miscellaneous	48	59

The Present Rate of Timber Growth on Commercial Forest Lands in Farm and Miscellaneous Ownership Is Considerably Lower Than the Potential Growth.

Commercial forest land in the United States is not producing wood to its full potential. In both the East and the West, the rate of timber growth for all ownerships averages only about half the level of growth attainable in fully-stocked natural stands. In the southern States, for example, timber growth currently averages about 45 cubic feet per acre each year. On some lands, where forest management has been intensified through thinning, planting, and other cultural work, yield has been at least doubled. There are millions of acres across the Nation on which intensification of cultural practices would be a good investment.

By far, the greatest potential for increasing timber supplies is on the 296 million acres of small, nonindustrial forest holdings. At present, these lands produce an average growth of wood per acre of only 36 cubic feet per year. This is considerably less than half their potential

Both public lands and industry lands, of course, can also produce increased timber growth, although the degree of intensification is already considerably higher than on private lands. The Forest Service feels that on National Forests substantial acres of nonstocked forest lands could be planted in addition to the presently scheduled planting program, and millions of acres could be made more productive through thinning and other cultural work.

Some of the best managed commercial forest land are owned by industry, yet average net annual growth on these lands is only about 60 percent of average potential growth.

National Timber Growth in 1970 Fourteen Percent Higher than in 1962.

Despite rising harvests and dwindling commercial forest land on a national basis, annual timber growth in 1970 was 14 percent greater than it was in 1962. This increased growth, though far below the projected rise in demand on U.S. forests, illustrates the impact of cultural and protection improvements. These growth gains are largely a result of recent levels of restocking of commercial forest lands, improved protection programs against fire, insect and disease, and improved types and conditions of tree stands.

Though Imports of Timber Products are Expected to Increase, Rising Exports Will Tend to Offset Any Major Gain to Future Timber Supplies

In the last couple of decades, imports of timber products, chiefly softwood lumber, wood pulp, newsprint and hardwood plywood, have increased by about one billion cubic feet. This, however, has been offset by rising exports of such products as pulp, paper, and softwood logs.

In 1971, U.S. imports of wood products reached an all-time high of 2.7 billion cubic feet, equaling one-fifth of all wood consumed in the United States that year. Most of this was imported from Canada.

Exports, meanwhile, totaled 1.2 billion cubic feet in the same year. Thus net imports totaled 1.6 billion cubic feet, or 11 percent of the total wood used in the U.S.

Projections indicate that imports could rise from the current 2.7 billion cubic feet to 4.7 billion cubic feet by the year 2000, if prices rise 30 percent on lumber and plywood, 15 percent on miscellaneous products and 10 percent on pulp and paper. (One of the three assumed price alternatives discussed in the following section on Demand.) But exports, at the same time, are expected to rise to 2.6 billion cubic feet. This means that under these assumptions the net increase of imports over exports by the year 2000 would be only a little over half a billion cubic feet above 1971 net import totals. The conclusion must then be that imports would provide only a small part of the answer to prospective problems of future wood supply in the United States.

DEMANDS FOR TIMBER PRODUCTS

Demands for all timber products rose 70 percent during the past three decades, and comparable increases are projected in future years if prices and forest management practices do not change a great deal. Alternative projections of future demands in the present study were also based on (1) estimates of growth in the Nation's population, (2) economic development, and (3) possible price trends for wood products.

Basic Assumptions Considered in Demand Projections.

Population

The U.S. Bureau of Census has made a number of estimates of possible population growth to the year 2000. Considering several sets of variable factors, the estimates range from 266 million to 301 million. A medium projection used by the Forest Service was a middle estimate of 281 million people by the year 2000. This is an increase of about 40 percent, or 70 million people over the 1970 head count of 207 million. The needs of this additional 70 million people for products made from wood will have significant impacts on future demands for timber as well as other raw materials.

Economic Indicators

Again, using a "middle" estimate, gross national product is projected to rise to \$2.86 trillion by 2000, or more than three times the GNP for 1970. These estimates are consistent with recent projections by the Bureau of Labor Statistics and other agencies.

Disposable income, which historically has hovered around 69 percent of GNP, has been estimated at \$1.95 trillion in 2000, about three times the 1970 level. Per capita disposable income is expected to double the 1970 figure, reaching \$6,930.

Timber Prices

Over the past century or so, lumber prices in the United States rose at compound rates averaging 1.7 percent annually, relative to price for other commodities. Prices leveled off during the years 1950-68 largely because of major improvements in productivity in logging and processing.

Softwood plywood prices during this 1950-68 period declined dramatically as new technology and improved equipment led to lower costs and to a broadening of the raw materials base for this industry. However, in 1969 and in 1971 relative prices of both softwood lumber and plywood increased substantially.

In an effort to identify the impact of prices on potential future supply and demand conditions, demand projections for the study were made based on three different prices for 1970 through 2000.

Projections of timber supplies were based on both a continuation of 1970 levels of forest management, and average past rates of increase in utilization of available supplies.

Supply-Demand Projection for the Year 2000 at Three Different Price Levels.

(Price levels on which the following projections are based are stated in terms of their relationship to average wholesale prices for all commodities, and relative to prices for competing materials.)

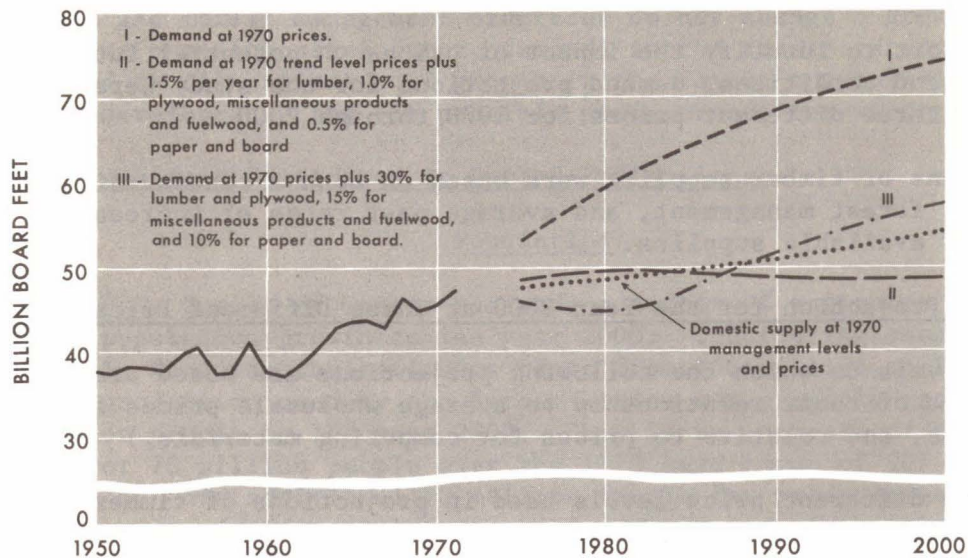
The three different price levels used in projections of timber supply and demand to the year 2000 are:

1. Prices at 1970 relative levels.
2. Increases in relative prices over 1970 of:
 - 30 percent for lumber and plywood.
 - 15 percent for miscellaneous product and fuelwood.
 - 10 percent for paper and paperwood.

(For lumber and plywood this would approximate average relative price levels during 1971-72.)
3. Average annual price increases above 1970 relative levels of:
 - 1.5 percent for lumber
 - 1 percent for plywood, miscellaneous products and fuelwood.
 - 0.5 percent for paper and paperboard.

(By 2000, this would be an increase in relative prices over 1970 levels of 50 to 60 percent for lumber; 30 to 40 percent for plywood, miscellaneous products, and fuelwood; and 16 to 20 percent for paper and paperboard.)

Softwood sawtimber - demand on U.S. forests and domestic supply



Projected Supply and Demand on U.S. Forests for Softwood Sawtimber by the Year 2000.

	<u>Billion Board Feet</u>		
	<u>Available Supplies</u>	<u>Demand</u>	<u>Difference</u>
---At 1970 prices	54	74.4	-20.4
---At 30, 15, 10 percent increase (See Pg. 6)	55.3	57.2	- 1.9
---At 1.5, 1, 0.5 percent annual increase (See Pg. 6)	55.6	48.7	+ 6.9

The Softwood Sawtimber Supply Problem is the Most Serious and Immediate.

In 1970, a total U.S. consumption of softwood sawtimber was 47.1 billion board feet, of which 45.1 billion board feet were harvested from U.S. forests. The remainder was made up by net imports.

At 1970 prices, available supplies with current management would fall short of projected demands in the year 2000 by an estimated 20 billion board feet. By 1980, the shortfall would already have reached 12 billion board feet.

With a "30 percent price" increase, the projected shortfall by 2000 would be 2 billion board feet; with a "one and one-half percent" a year price increase, supply would exceed demand by approximately 7 billion board feet.

The considerable price increases needed to achieve a balance between future timber demands and supplies at present levels of forest management could have a serious impact on housing, living standards, and the urban environment.

For all sizes and qualities of softwood timber, the projected supply-demand balance is essentially the same as the outlook for softwood sawtimber. Prospective increases in "equilibrium" prices appear likely to be somewhat more modest, however, because of the inclusion of much larger volumes of material other than sawtimber in the supply base.

Projected Supply and Demand on U.S. Forests for Hardwoods by the Year 2000

	<u>Billion Board Feet</u>		
	<u>Available Supplies</u>	<u>Demand</u>	<u>Difference</u>
---At 1970 prices	20.6	22.6	-2
---At 30, 15, 10 percent increase (See pg. 6)	21.1	18.9	+2.2
---At 1.5, 1, 0.5 percent annual increase (See pg. 6)	21.4	16.7	+4.7

The Situation for Hardwoods Appears More Favorable than for Softwoods. However, Supply and Price Problems can be Expected for the Higher Quality Species and Grades.

Hardwoods are principally used in making furniture, pallets, a wide variety of items such as toys and household articles, and plywood paneling. Such woods as walnut, birch, cherry, elm, and oak are preferred for products such as furniture and paneling.

Hardwood resources are far from homogenous, and supply and demand figures relate to different mixes of raw material. Much of the growth and "available supply" of hardwoods is in small tree sizes and species for which markets are extremely limited. Much of the hardwood timber harvest, on the other hand, is concentrated on larger sizes and preferred species. For such preferred material, harvest on a national basis have been close to, or above, annual growth in recent years.

The availability of timber for harvesting is also affected by factors of location and ownership. Much of the larger size hardwood sawtimber that is suitable for manufacture of high-quality lumber or veneer occurs as widely dispersed trees or groups of trees that may not be economically harvestable. Considerable timber also is in privately owned tracts that are held primarily for recreation or other purposes which result in constraints on timber harvesting.

The current hardwood growth-removal balances and the projections of supplies indicates that the potential future growth in the hardwood industries will be mostly in the North. The available data on the resource also suggests that expansion will be easiest for the pulp industry and that part of the lumber industry which produces such products as railroad ties and pallet timber.

Supplies of Wood for Pulp and Paper Appear More Adequate, but the Supply-Demand Situation for Softwood Sawtimber Will Also Affect Supplies and Prices of Pulpwood.

For the pulp and paper industry the outlook is more favorable since this industry can utilize small trees and low-quality material, including residues. Nevertheless, this industry will also be affected by price increases and tighter supplies of timber for lumber and plywood. Substantial amounts of sawtimber are cut for pulpwood. Price increases can be expected to spread to all sizes of material.

Pulpwood harvests have more than doubled in the last two decades. In addition to the 3.8 billion cubic feet of roundwood harvested for pulp in 1970, an additional 1.8 billion cubic feet of pulp chips were obtained from industrial by-products, mainly slabs and edgings at sawmills.

The South led the Nation in round pulpwood production in 1970 with two-thirds of the total. The strength and versatility of southern pines plus the historic advantages of low production costs and access to eastern and foreign markets, have helped maintain the South's dominance in this industry. The western United States recently has gained a slightly larger share of the Nation's total production of pulpwood due to rising exports of pulp chips, but accounts for only one-eighth of the U.S. total production of round pulpwood.

Softwoods, mainly southern pines, made up 72 percent of the 1970 pulpwood harvest. The proportion of hardwoods in the round pulpwood harvest has risen steadily however, from 15 percent in 1952 to 28 percent in 1970. Equally significant is the shift away from almost total dependence on soft-textured hardwood species such as yellow-poplar, aspen, and gum, to the more plentiful oaks, hard maple, beech, hickory, and paper birch.

SOME IMPLICATIONS

With Inadequate Wood Supplies Use of Substitutes is a Possible Alternative, But This Could Lead to Adverse Environmental Effects and Speed the Depletion of Nonrenewable Resources.

A shortage of timber would mean greater pressures to use substitute materials for home construction and other products. However, such substitutes as steel, aluminum and plastics, unlike timber, are derived from nonrenewable resources. There is evidence of increasing scarcity of minerals, and sources of energy such as natural gas and petroleum that are needed to convert minerals into usable products. Thus, the long period of relative price stability that has characterized many of the industrial raw materials that compete with timber products may be approaching an end. The obvious result, then, of a shift to use of competing materials would be higher costs of housing and other end products, with consequent adverse impacts on consumers.

Production of these competitive materials also requires relatively high amounts of energy compared to production of wood products. This energy, also, is generated from nonrenewable resources such as natural gas, oil, and coal. As an example, it has been determined that the amount of energy required in producing steel for use in framing exterior walls of a house would be three times as great as that required for an equivalent amount of wood. Eight times as much energy would be needed for use of concrete blocks.

In addition, the use of competing materials would lead to increasing pollution problems, considerably greater than those of wood processing. Environmental quality controls on mining and waste processing, as well as rehabilitation of disturbed land surface, also would certainly lead to higher product costs.

To the extent that timber supplies are not available at reasonable prices, increasing volumes of substitutes will be used. But this will involve higher social, environmental, and economic costs to the Nation.

The Greater Potential for Significantly Increasing Timber Supplies and Holding Down Prices Are: (a) Intensifying Growth Rates of Timber in Domestic Forests and (b) Improving Product Yields From Current Raw Materials

Intensified Forestry

Commercial forest land in the United States is not producing wood to its technical or economic potential, and a considerable increase of wood supplies in the future is possible through intensification of forest management. Some increases in future supplies are possible on public and industrial forest lands through increased application of cultural practices. The greatest potential gains could be obtained on the 296 million acres of non-industrial, private lands which have commercial forest-growing qualities. At present these lands are growing an annual average of only 36 cubic feet. Thus, 3/5 of the productive timber land base is producing at about only 1/3 of its potential.

It is important to emphasize that "intensified forestry" is not synonymous with intensified harvesting, or even increased harvesting. Intensified forestry refers to an expansion of efforts in applying forestry practices that can provide more rapid growth of timber, improved access to timber, and improved methods of insect, disease, and fire control.

(It is Forest Service policy that potential increases in harvests on National Forests would only be possible after such forestry practices had been applied on the ground that earn, or justify them. Once these practices are applied on the ground the resultant increase in long-term growth rates would allow a proportionate increase in harvests within the context of maintaining sustained yields of timber in the future. By law the Forest Service must manage National Forest timber resources on a sustained yield basis.)

Better Utilization of Available Supplies

A recent study shows that up to 18 percent of the total volume of softwood and 31 percent of hardwood growing stock harvested every year are not used for products. If even half of this volume of wood fiber could be channeled into use, the annual output of timber products could be increased substantially.

Major progress has been made in using mill residues for manufacturing paper, board, and other pulp products. In fact, mill residues now make up about 23 percent of the total wood fiber required for these products. However, in 1970, an estimated 5 million cords of such coarse material as slabs and edgings, and the equivalent of 7.4 million cords of sawdust and other fine material were unused in primary manufacturing plants.

These unused plant residues amounted to about a billion cubic feet. In addition, an estimated 2.9 billion cubic feet of wood was left on the ground after logging.

Another possible source for extending timber supplies for wood pulp is recycling. In 1971, only 10 million tons (about 17 percent) of the paper and board consumed in the United States was reused. Experience in western European countries and Japan indicate it is possible to reuse as much as 40 percent.

Several factors are presently encouraging increased use of residues, although the level of use is still far below potential. Improvements in equipment for handling, transporting and converting timber, along with expanded markets, have made possible a number of improvements in timber utilization. Also, environmental considerations are promoting increased cleanup and better utilization of timber on harvested areas, particularly on public lands.

A continuing increase has been occurring in the number of integrated firms in forest industries, which manufacture a range of products to use entire trees for the best combinations of lumber, pulp, particleboard and other products. Higher timber prices will also tend to encourage even closer utilization of timber.

Considerable Improvement in Timber Supply is Possible if Research Efforts are Expanded, Along With Greater Application of Research Results, to Help Solve Protection, Harvesting and Milling Problems.

Research is a key element in improving the timber supply picture, both in the woods and at mills. For example, even though massive protection programs have been carried out against forest pests, a heavy toll of timber growth is still caused by insects and disease. In addition, fires which sweep over four to five million acres of forest in the Nation each year cause substantial losses.

It is estimated that all destructive agents, such as fire, insects and disease caused losses in 1970 of 15.3 billion board feet of sawtimber. The loss of these larger trees rated as sawtimber, nullified about one-fifth of the total annual timber growth in the Nation.

Great strides are being made in providing more wood, while protecting the environment, through improved logging systems and through use of more efficient systems and equipment for manufacturing wood products. But much more progress is possible.

Improvement in utilization so far has largely involved the use of slabs, edgings, sawdust, veneer cores, shavings and other similar material for pulp and particleboard. Some changes have also taken place in increased product yield per unit of logs brought to the mills. These have included such technological developments as thin kerf, high-strain bandsaws which make thinner cuts. The chipping headrig is a further example of new technology now coming into wide use to produce both lumber and pulp chips. It is used in a high-speed continuous process that makes possible the profitable conversion of small logs into useful products.

An example of new technology just now coming on the scene is the "Best Opening Face" system which uses automated headrig control by a mini-computer to locate precisely the best initial cut to maximize lumber yields. Calculations indicate that this BOF system, has the potential to increase lumber yields by possibly 10 percent.

Still other research presently on is aimed at developing harvesting systems that may be able to take timber from inaccessible or environmentally sensitive areas with minimum impacts. These include aerial systems--such as with helicopters, balloons and skyline cable logging.

Greater progress in improvement and adoption of forestry practices and utilization systems could contribute greatly to wood-product production from the available timber supplies.

(A series of questions and answers relative to the study follow on page 15.)

QUESTIONS AND ANSWERS

QUESTION: What were the reasons for the great increase in wood prices in 1967-68 and again in 1971-72?

ANSWER: The timber industry is historically one of swinging cycles, some of them dramatic. It is, of course, responsive to fluctuating public demands for wood products, particularly housing. In both 1967-68 and 1971-72, the rate of home building and industrial construction soared. The year 1972 will be a record one for production of housing, reaching perhaps as high as 2.4 million units, including nearly 2.4 million conventional units and over 560 thousand mobile homes. The timber industry is limited in its capacities to react quickly to such increases.

Problems of timber supply in those two periods of high prices related primarily to softwood sawtimber needed for lumber, and plywood for housing and various other uses. For that reason, softwood sawtimber was the focus of the President's Task Force on Lumber and Plywood in the earlier periods, and for the present activity of the President's Advisory Panel on Timber and the Environment.

QUESTION: What progress is being made toward better utilization of waste wood?

ANSWER: Industry has made considerable progress in utilizing the residues of manufacture, and in reducing the volume of unused material left in the woods after logging.

Improvements in utilization, however, have largely involved the expanded use of slabs, edgings, sawdust, veneer cores, shavings and other similar material for pulp and other products. Use of thinner saws in cutting boards and timbers has also increased the amount of product which can be secured from logs. Integrated mills have been established to make a variety of products and thus use a greater volume of the log.

But there is much more that could be done through research and development, industrial application of better technology, and development of systems that could substitute what are now wood wastes for uses presently requiring lumber.

Modernization of many plants, with concomitant introduction of advanced technology already available, would permit increased recovery of lumber from available logs. Better sorting systems to insure the best end use of material would also help stretch sawlog supplies.

Stepped-up research and development efforts could increase wood supplies. Obvious possibilities are aerial logging techniques, fertilization, genetically improved tree-planting stock, use of bark, limbs and other debris left in the woods, more efficient cultural measures to get improved growth from trees and recycling.

QUESTION: What are the projections for future housing construction and what effects will they have on timber supply?

ANSWER: In 1970, over a third of the softwood lumber and plywood consumption, plus substantial volumes of other timber products such as hardwood plywood, particleboard and insulation board, were used in housing. Housing starts are expected to continue to rise during the rest of this century. A temporary relative drop from the high 1972 levels is expected, but the trend for the Seventies is for continued increases in the rate of housing starts.

Average production in the decade of the 1960s of housing units, both conventional and mobile, was 1.7 million. This included 1.4 million conventional units. This year, the total is expected to rise to 2.4 million.

Based on potential demand for housing under the assumptions of increasing population and economic growth, the annual average of housing unit construction by 2000 is expected to rise to 2.9 million. A leveling off of demand for housing after 1980 is anticipated, but at a considerably higher point than today's averages. Then, increases will continue, but more slowly than before.

Because of the current extremely high level of housing construction, it appears very likely there will be a temporary slowdown as housing supply overtakes the demand. F. W. Dodge Division of McGraw-Hill recently predicted a "temporary overabundance of new dwellings" because the housing boom is of such major proportions the market cannot absorb it on a continuing basis.

The "medium" demand projections for all lumber uses will reach 62.5 billion board feet by 2000, a volume some 1.6 times higher than that of 1970.

QUESTION: Since we have to import to fill out wood needs in the United States, why can't we ban exports of logs and wood products? Why wasn't the abolition of log exports to Japan suggested as a means of increasing supplies?

ANSWER: This is somewhat beyond the scope of this study, which was designed to analyze present and future timber demands and supplies within existing policies. Ban of exports would involve foreign policy and balance of payments considerations.

However, in the event log exports were cut off, our biggest customer Japan, would very likely turn to Canada for lumber purchases. Japan then would become a competitive buyer for lumber which is now being imported by the United States. This could have the effect of lowering United States imports of wood products from Canada.

Most log exports are harvested on private lands. Under present law, not more than 350 million board feet of the more than two billion board feet of log export can come from Federal lands.

Alaskan exports to Japan are considerable, but this is primarily because there is practically no competing market for the Alaskan wood in the lower 48 States. One factor in this situation is the relatively higher cost of shipping in American ships as required by Federal law.

QUESTION: Have you discovered major significant differences in the findings in this study and those made in the last survey?

ANSWER: One of the most significant changes in assumptions relate to population expected by 2000. The middle projection made by the Bureau of Census at the time of the 1962 study was 325 million people in the United States by 2000. As a result of revised estimates by the Bureau of Census the middle projection being used by the Forest Service for this report is 281 million.

A second difference, as mentioned earlier, is an assumed downward trend in the amount of commercial timber land in the United States. It was noted in the 1965 report that the decade between 1952 and 1962 had shown an increase in commercial forest area of 7.6 million acres. Between 1962 and 1970 this trend had been reversed, resulting in a loss of 8.4 million acres of commercial forest land.

The basic findings and conclusions in the 1965 report as to potential supply-demand imbalances are still sound and are reemphasized in the current report.